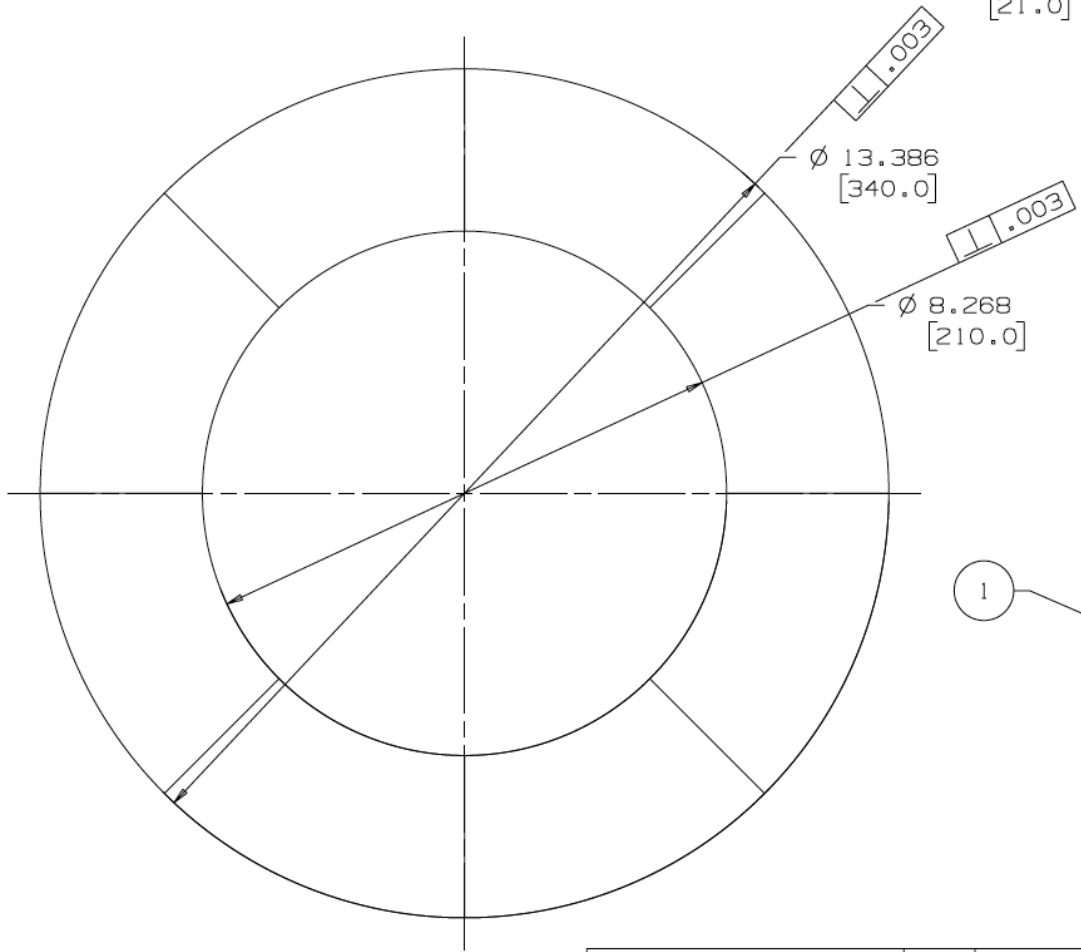


# Garnet Ring Specifications

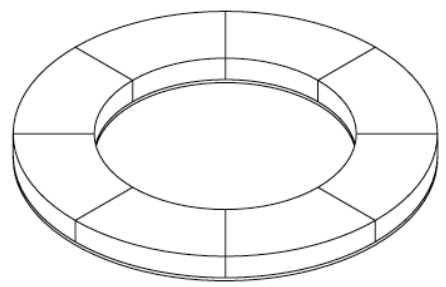
C.Y. Tan  
25 Feb 2016

DESCRIPTION: GARNET ALUMINA DISK ASSEMBLY  
CATEGORY: PROJECT:

FOR QUOTATION PURPOSES ONLY. NOT A MANUFACTURING DRAWING.



REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES
-	F10054252---RCD		DRAWN
			APPROVED



NOTES:  
1. ITEM 1 TO BE ADHERED TO ITEM 2  
WITH EPOXY. PROCEDURE TO BE  
APPROVED BY FNAL.

2	F10045159--	ALUMINA DISK	1
1	F10045158--	GARNET SECTOR	8
ITEM NO	PART NAME	PART DESCRIPTION	QTY

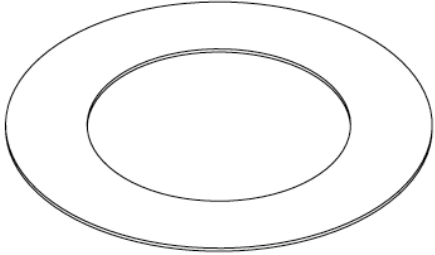
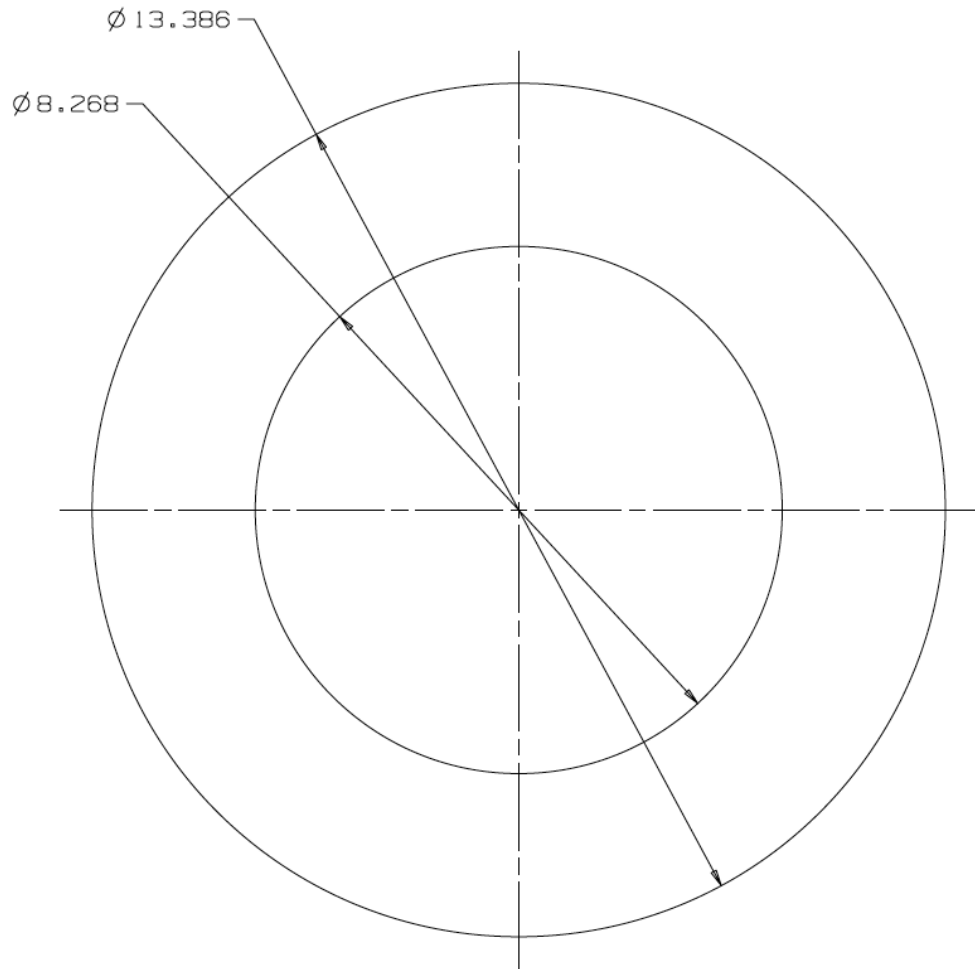
UNLESS OTHERWISE SPECIFIED					DRAWN	K.DUEL		DATE	10-Feb-2016		FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY						
±.X	±.XX	±.XXX	±X/X	±X"	CHECKED		DATE										
.1	.02	.005	1/16	1"	APPROVED		DATE										
BREAK ALL SHARP EDGES .015 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 125 DRAWING UNITS: INCHES					USED ON					NAME							
					MATERIAL					GARNET ALUMINA DISK ASSEMBLY							
					SEE PARTS LIST					SCALE 1:2							
GROUP:					CAGE CODE: 0U5R6					SIZE	B	DRAWING NUMBER	F10054252	SHEET	1 OF 1	REV	-

DESCRIPTION: ALUMINA DISK  
CATEGORY: PROJECT:



 .003  .003 A

A

.118



REV	REVISION CONTROL DOCUMENT	DATES	SIGNATURES	
-	F10045159---RCD		DRAWN	
			APPROVED	

UNLESS OTHERWISE SPECIFIED					DRAWN		DATE		FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY	
±.X	±.XX	±.XXX	±X/X	±X°	CHECKED		DATE			
.1	.02	.005	1/16	1°	APPROVED		DATE			
BREAK ALL SHARP EDGES .015 MAX. DO NOT SCALE DRAWING DIMENSIONS BASED ON ASME Y14.5-2009 MAX. ALL MACH SURFACES 125 DRAWING UNITS: INCHES					USED ON					
 					MATERIAL				NAME	
					ALUMINA - 99.5% GRADE				ALUMINA DISK	
GROUP:					CAGE CODE: OUSRB				SCALE 1:2	SIZE B
									DRAWING NUMBER F10045159	SHEET 1 OF 1
									REV -	

# Vendor (TCI Ceramics)

- We will supply assembled garnet ring glued with single-piece Alumina ring per your drawing.
- Garnet ring will be made at National Magnetics/TCI by producing eight square blocks, squaring it up, cut a triangle off at 45° at a certain point and sent to Fermilab to be glued up and further glued with Alumina ring procured by Fermilab with ~0.030" machining margin in OD and ID.
- Machine at NMG/TCI outer and inner diameters and finish up thickness only on the garnet side.
- Garnet Material Grade: AL-800, Line width < 40 Oe, will try lower but can not guarantee. We will make the ring out of eight oversized blocks. Sample pieces for electrical testing will be drawn from cut off pieces of these blocks. Witness pieces will be sent to Fermilab for reference testing.
- Outer diameter: 13.386" +/-0.005", Inner diameter: 8.268" +/-0.005", Thickness (Garnet): 0.827" +/-0.005", Flatness/Parallel/Perpendicular: 0.003". Alumina thickness: 0.118"+/-0.005"
- Quantity: 2 pieces
- Witness pieces:
  - We measure  $\Delta H$  with a sphere of diameter 0.050"-0.055" produced from a ~1" cube.
  - (from 2/5/16 email) Garnet Material Grade: AL-800, Line width < 40 Oe, will try lower but can not guarantee. We will make the ring out of eight oversized blocks. Sample pieces for electrical testing will be drawn from cut off pieces of these blocks.
  - We have to make sure that witness pieces are specified in our contract.

# Cost

- Enough garnet for 2 rings + machining:  
 $2 \times (15,880) + 3000 = \$34,760$ .
- 2 alumina rings (99.5%) =  $2 \times (1,250) + 1250 = \$3750$ .
- Total cost = **\$38,510**. Does not include labor for gluing garnet and alumina ring at FNAL.

# Questions to be addressed

- Shape of garnet pieces that will be sent to us.
  - This will impact how we hold the pieces together.
  - Holder/box for garnet ring after gluing to send back to TCI.
- Test gluing and curing in vacuum
  - Contact at TD to start